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## *Machaerina* (Cyperaceae) in South America

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**ABSTRACT.** The genus *Machaerina* Vahl (Cyperaceae) now consists of five species in South America. A key to the taxa, a description of the genus and each taxon, nomenclature, and an illustration of the mature fruit (achene) for each taxon are provided, and the distribution of each taxon is mapped. Two new species, *Machaerina ayangannensis* M. T. Strong from Guyana and *M. austrobrasiliensis* M. T. Strong from southeastern Brazil, are described.

While studying specimens of Cyperaceae for the *Flora of the Guianas* (Guyana, Suriname, and French Guiana), I noted a new species of *Machaerina* Vahl from Guyana. The new species was collected on the summit of Mt. Ayanganna in the Pakaraima mountains by Biodiversity of the Guianas Program, Smithsonian Institution botanists Terry Henkel and Bruce Hoffman. This important discovery initiated a study of other taxa of *Machaerina* occurring in South America, the results of which are presented in this paper.

When Vahl (1805) described *Machaerina*, he based it on a single West Indian sedge, *Schoenus restioides* Swartz ( $\equiv$  *Machaerina restioides* (Swartz) Vahl). Since then, *Machaerina* and other closely related genera, e.g., *Baumea* Gaudichaud-Beaupré (1829), *Chapelliera* Nees (1834), and *Vincentia* Gaudichaud-Beaupré (1829), have been treated primarily as subgenera or sections in *Cladium* P. Browne (1756), or treated as separate genera. Brown (1810) was one of the first to circumscribe *Cladium* in a broad sense. He described a number of new species of *Cladium* from Australia, some of which have since been referred to *Baumea*, *Gahnia* J. R. & G. Forster, and *Machaerina* sensu lato. Bentham (1878) adopted Brown's earlier treatment of *Cladium* but treated *Baumea* as a section of *Cladium*, placing all the taxa in it except *Cladium mariscus* (L.) Pohl, which he placed in the nominate section. Bentham (1883) later circumscribed *Vincentia* as a section of *Cladium*. Kükenthal (1942) followed Clarke (1894, 1908) in treating *Machaerina* as a subgenus of *Cladium*. He separated *Cladium* into three subgenera (*Cladium*, *Machaerina*, and *Baumea*). Subgenus *Machaerina* was separated from the nominate subgenus *Cladium* by its 2-ranked leaves, 2–6-flowered spikelets, 3 stamens,

triquetrous or winged obpyramidal stipe of the achene, and lack of a disc supporting the base of the achene vs. 3-ranked leaves, 1–3-flowered spikelets, 2 stamens, truncate base of the achene, and presence of a disc supporting the base of the achene in subgenus *Cladium*. From the primarily Asian, Australian, and Pacific Island subgenus *Baumea*, he separated subgenus *Machaerina* by its 2–6-flowered spikelets with all flowers fertile, and the stipitate, trigonous, attenuate, wing-angled bases of the achenes vs. 1–3-flowered spikelets with only a single fertile flower, and sessile base of the achene in subgenus *Baumea*. The characters considered by Kükenthal to unite many of the above genera with *Cladium* were the persistent leaf sheaths at the base, the elongated branching of the inflorescence, the shape of the fruit (achene), and the shape of the style base. Other characters that have been used to unite many of the aforementioned genera with *Cladium* (see Kern, 1959, 1974) include the supposedly spiral arrangement of the spikelet scales; usually 1–3-flowered spikelets; usually pubescent style base; and lack of persistent bristles at the base of the achene.

Other authors have treated *Baumea*, *Chapelliera*, *Machaerina*, and *Vincentia* as separate genera. Nees (1834) recognized all these genera as distinct and placed them in his tribe Cladieae Nees ex Fenzl. Endlicher (1836), Kunth (1837), Steudel (1855), and Böckeler (1874) also treated many of these genera as distinct but placed *Machaerina* in the tribe Rhynchosporae Nees ex Fenzl. Koyama (1956) treated *Vincentia* and *Baumea* (including *Chapelliera*) as sections of *Machaerina*. He later recognized the tribe Cladieae and included in it *Machaerina*, *Cladium*, and *Rhynchocladium* T. Koyama, a northern South American endemic genus (Koyama, 1972). Kern (1974) included *Baumea* and *Vincentia* in *Machaerina* following Koyama (1956), but did not recognize these at either a subgeneric or sectional level, and placed *Machaerina* in the tribe Rhynchosporae. Lye (1983) and Haines and Lye (1983) treated *Baumea* as a subgenus of *Machaerina* and placed *Machaerina* in the tribe Rhynchosporae, albeit with some uncertainty. More recent classifications of the Cyperaceae

(Goetghebeur, 1986; Bruhl, 1995) place *Machaerina* in the tribe Schoeneae Dumortier. This tribe includes Cladieae sensu Koyama and a large number of genera primarily restricted to the eastern hemisphere (South Africa, Asia, Australia, and the Pacific region), the tribe Rhynchosporae being essentially represented only by the primarily American genera *Rhynchospora* and *Pleurostachys*.

Koyama (1956) presented palynological as well as morphological evidence from floral and leaf characters showing that *Cladium* and *Machaerina* were better treated as distinct genera. He characterized species of *Cladium* as having 3-ranked, dorsiventrally compressed, scabrous-margined leaf blades; 2 stamens; pollen of the 1–6 aperture type; and drupelike, corky achenes with inconspicuous style bases, while *Machaerina*, *Baumea*, and *Vincentia* generally possessed 2-ranked, unifacial, terete or bilaterally compressed, smooth-margined leaf blades; 3 stamens; pollen of the polyforate type; and 3-angled, hardened achenes with distinct usually hispid or scaberulous style bases. Kern (1959) pointed out that *Machaerina* species (sensu Koyama) have spikelet scales that are always distichous (2-ranked) and culms [stems] that are pithy or septate in contrast to the spirally arranged (3-ranked) spikelet scales and hollow culms of *Cladium*. Blake (1969) argued further that the structure and morphology of the fruit (achene) of species of *Baumea* were distinct from *Cladium* and *Machaerina*. He showed that the mature fruits (achenes) of species of *Baumea* were unwinged; sessile, rounded or obpyramidal at base; devoid of bristles; and have a thick pericarp, thick hard bony endocarp, spongy or crustaceous usually thick mesocarp, and a thin membranous epicarp. Those of *Machaerina* were shown to have a 3-winged stipitate base; 3-winged or sharply 3-angled style base that is decurrent over the shoulders of the achene body; bristles in some species; a very thin brittle pericarp; and endocarp, mesocarp, and epicarp scarcely distinguishable.

Species of *Machaerina* Vahl sensu stricto (including *Vincentia*) are herein treated as defined by Blake (1969). However, further study of species from the West Indies (to be treated in a separate paper) and possibly others worldwide may indicate that the generic limits defined by Blake (1969) will need to be amended (see discussion of the West Indian taxa). *Machaerina* species can be distinguished from other members of the Cyperaceae by the following combination of characters: 2-ranked leaves; unifacial leaf blades; distichous spikelet scales; triquetrous, 3-winged stipitate base and persistent 3-winged or sharply 3-angled style-base of



Figure 1. Distribution of *Machaerina* in South America. ▲ *M. austrobrasiliensis*. ■ *M. ayangannensis*. ● *M. ensifolia*. ◆ *M. ficticia*. ○ *M. scirpoidea*.

the achenes, with angles that are whitened or blackened, crinkled, blistered, beset with crystalline fimbriellae or scales, or sometimes antrorsely scabrous; and 6–3 well-developed or reduced and rudimentary bristles at the base of the achene.

South American species of *Machaerina* are generally plants of upland or montane habitats from 1000 to 2500 m elevation. Three species occur in the Brazilian Region of South America, in mountain ranges of southeastern Brazil (Fig. 1). The other two species are widely separated from the Brazilian plants and occur in different floristic regions. *Machaerina ayangannensis* represents a floristic element of the Guayana Highlands Region of northern South America. However, its affinities to the West Indian species *M. restioides* suggests a floristic connection with the Caribbean Region as well. *Machaerina scirpoidea*, endemic to Isla Más a Tierra, Juan Fernández Islands, Chile, represents an element of the Fernándezian Region. The most significant floristic affinities of this region lie with the Chile-Patagonian Region (extratropical, southern parts of South America including Argentina south to part of the Antarctic peninsula, and southern

Chile), and is included in the Holantarctics, not in the Neotropics (floristic regions after Takhtajan, 1986).

The remaining species of *Machaerina* occurring in the Americas are found in the West Indies, primarily in the Greater Antilles. The widespread *M. restioides* (Swartz) Vahl, which occurs in both the Greater and Lesser Antilles, shares the most affinities with the South American taxa. Shared characteristics include the smooth lenticular to ancipital culms; smooth, wide, ancipital leaf blades; long-stipitate base of the achene; wing-angled achene body; and distinct constriction below the middle of the achene body just above the stipitate base. Three other species were treated by Kükenthal (1942) in *Cladium* subg. *Machaerina* from the Greater Antilles (Cuba and Hispaniola). These three species all differ from *M. restioides* and the South American taxa in having scabrous or scabrous-margined culms and leaf blades; short-stipitate to essentially estipitate achenes; acutely angled achene body (essentially wingless); and a uniform achene body, which lacks a distinct constriction below the middle. The culms and leaf blades of these three species range from being strongly flattened in *M. ekmanii* (Kükenthal) T. Koyama (characteristic of the ancipital culms and blades of *M. restioides*), or somewhat thickened and compressed in *M. cubensis* (Kükenthal) T. Koyama, to broadly lenticular and nearly terete in *M. filifolia* Grisebach. However, these three taxa possess distichous leaves; unifacial, septate-nodulose leaf blades; a three-angled style base with angles bearing trichomes; and persistent bristles at the base of the achene, all characters typical of *Machaerina* sensu stricto. Blake (1969) indicated that the achene carpel structure surrounding the ovary of both *M. ekmanii* and *M. cubensis* is characteristic of other species of *Machaerina* sensu stricto, although he only provided an illustration of the achene of *M. restioides* in longitudinal section. He did not discuss *M. filifolia*, a species that does not entirely fit his circumscription of *Machaerina* sensu stricto, particularly the subterete culms and leaf blades of that species. The extreme differences in some characters, particularly leaf blade and achene characteristics between *Machaerina* species in the West Indies, may indicate that they were not derived from a single ancestor.

The following description of *Machaerina* is based primarily on the South American taxa, but is applicable to species of *Machaerina* sensu stricto worldwide as defined by Blake (1969).

***Machaerina*** Vahl, Enum. Pl. 2: 238. 1806. *Cladium* subg. *Machaerina* (Vahl) C. B. Clarke, in

Hooker f., Fl. Brit. India 6: 674. 1894. TYPE: *Schoenus restioides* Swartz  $\equiv$  *Machaerina restioides* (Swartz) Vahl.

*Trasi* P. Beauvois, in T. Lestiboudois, Essai Cypér. 32. 1819. TYPE: not designated.

*Vincentia* Gaudichaud-Beaupré, in Freycinet, Voy. Uranie: 417. 1829. *Cladium* sect. *Vincentia* (Gaudichaud-Beaupré) Benth & Hooker f., Gen. Pl. 3: 1066. 1883. *Cladium* subg. *Vincentia* (Gaudichaud-Beaupré) C. B. Clarke, Bull. Misc. Inform. Ser. 8: 124. 1908. TYPE: *Vincentia angustifolia* Gaudichaud-Beaupré  $\equiv$  *Machaerina angustifolia* (Gaudichaud-Beaupré) T. Koyama.

*Terobera* Steudel, Syn. Pl. Glumac. 2: 164. 1855. TYPE: *Terobera scirpoidea* Steudel  $\equiv$  *Machaerina scirpoidea* (Steudel) T. Koyama.

*Agylla* F. Philippi, Anales Univ. Chile 26(1): 643. 1865. TYPE: *Agylla ensifolia* F. Philippi = *Machaerina scirpoidea* (Steudel) T. Koyama.

Large or medium-sized perennials; rhizomes hardened, woody, short or horizontally creeping, often emitting creeping, stout, scaly stolons, 0.5–2 cm thick; sheathing base 8–40 mm wide just above rootstock, the leaves spreading; roots coarse, 1.5–4(–5) mm thick, dark brown to purplish brown. Culms central, solitary, compressed, lenticular to ancipital, frequently channeled along one edge distally, finely or sometimes coarsely ribbed, glabrous. Leaves numerous, 2-ranked, primarily basal, frequently 1–2(–3) reduced cauline ones medially, the upper (3–)5–11 basal ones bearing elongate blades, the lower with blades shorter than the sheaths or wanting; sheaths eligulate, laterally folded, narrowed to summit with an indentation along margins at junction with blade, finely ribbed, septate-nodulose, essentially glabrous; blades unifacial, flattened to ancipital in cross section, linear to linear-falcate, curving to an acuminate tip, finely ribbed, green, glabrous, the margins entire. Inflorescence 1–3 remote to subcontiguous or contiguous, open or contracted, partial panicles; main axes and lateral branches of panicles varying from trigonous to compressed-trigonous or crescentform in cross section, the rachises crescentform, rectangular, or subflattened in cross section, frequently flexuose, ciliate-scabrous to villous on edges, the trichomes frequently extending upward along margins of the short sheathing prophyllar bracts; bracts subtending panicles blade-bearing, the blades rarely exceeding length of subtending panicle, the uppermost ones often with an uncinat apex. Spikelets many, in turbinate or spherical clusters or fascicles of 2–4(–6), or sometimes solitary, laterally compressed, each subtended by a short or barely sheathing prophyllar bract, 2–7-flowered, with 0–4 basal scales empty, the scales distichous or some-

times nearly spirally arranged; scales laterally sub-compressed, thin, boat-shaped, keeled, brown to brown-black, purple-black, or black, the margins frequently ciliate. Flowers bisexual; stamens 3, the anthers sagittate at base, basifixed, bilocular, thecae parallel, longitudinally dehiscent, the connective forming an acuminate, lanceolate-subulate appendage at apex; style 3-branched, the stigmatic branches minutely scaly or fimbriate,  $\frac{1}{3}$  to  $\frac{1}{2}$  length of style. Achenes with a 3-winged, stipitate base and persistent, triquetrous or 3-winged style base, the wings thin and chartaceous or incrassate, decurrent and often with a distinct wire-like margin between base of wing and achene body; achene body globose, obovoid, turbinate, or ellipsoid, often with a constriction (sometimes indistinct) just above the stipitate cellular-reticulate base, faintly rugose or rugulose, finely transversely rugulose or wrinkled, or essentially smooth, the pericarp very thin and brittle; style base triquetrous or 3-winged, triangular to triangular-lanceolate, the angles often whitened or blackened, crinkled and blistered, scabrous, or beset with crystalline fimbriae or scales; bristles 6-3, subulate or flattened, antrorsely spinulose distally, or often undeveloped and represented only by very short rudiments at base.

KEY TO THE SPECIES OF *MACHAERINA* IN SOUTH AMERICA

- 1a. Inflorescence contracted, 5-13(-15) cm long (measurement from base of lowest partial panicle (excluding peduncle) to apex of uppermost panicle), 2-3.5 cm wide; partial panicles of inflorescence essentially contiguous; leaf blades (2.2-) 3-11(-12) mm wide; spikelets (7-)8-11 mm long, 2.5-4 mm wide; fertile scales (5.5-)6-10 mm long, (2.5-)2.8-3.8(-4.2) mm wide; achenes 6-9 mm long, 1.5-2 mm wide; achene body ellipsoid to narrowly ellipsoid or ellipsoid-obovoid . . . . . 1. *M. ensifolia*
- 1b. Inflorescence open, (15-)20-60(-70) cm long (measurement from base of lowest partial panicle (excluding peduncle) to apex of uppermost panicle), (3-)4-10 cm wide; partial panicles of inflorescence remote to subcontiguous; leaf blades (7-)8-25 mm wide; spikelets 4-7 mm long, 1.5-3 mm wide; fertile scales (2.5-)3-6(-6.2) mm long, 1.8-3 mm wide; achenes (2.5-)3-5 mm long, 1-1.3 mm wide; achene body obovoid, ellipsoid-obovoid, ellipsoid-globose, or turbinate.
  - 2a. Spikelets 5-7-flowered; scales dull or sublustrous, minutely antrorsely scabrous-hispid on sides distally; achene wing-angles represented by a series of longitudinal folds and pleats; achene body obovoid to ellipsoid-obovoid, finely transversely rugulose; style base indistinctly triquetrous, shiny, glossy, twisted and wrinkled with transverse or longitudinal folds and pleats that extend down to middle and along angles of achene body, minutely antrorsely scabrous toward

- apex; bristles 6, variable in length, rarely 1-2 rudimentary ones present; known only from Mt. Ayanganna, Pakaraima Mountains, Guyana . . . . . 2. *M. ayangannensis*
- 2b. Spikelets 1-3-flowered; scales lustrous, glabrous or sometimes with a few patches of appressed, matted, whitish trichomes on sides distally; achene with essentially plane wing-angles; achene body ellipsoid-globose or turbinate, faintly rugose or rugulose to nearly smooth; style base triquetrous with plane wing-angles, the wing-angles light brown, brown, blackened or whitened, crinkled or blistered, often with minute, crystalline fimbriae or scales; bristles often undeveloped and represented only by very short rudiments at base, or 1-6 with at least some rudimentary ones present; plants of Juan Fernandez Islands, Chile, and southeastern Brazil.
  - 3a. Sheaths essentially glabrous, only the marginal ribs at the orifice (junction of sheath and blade) bearing appressed trichomes; leaf blades 60-250 cm long; anthers 3-4 mm long; achene body ellipsoid-globose, narrowly winged or wing absent, brown, faintly rugulose with dark brown to blackish rugae; endemic to Isla Más a Tierra, Juan Fernandez Islands, Chile . . . 5. *M. scirpoidea*
  - 3b. Sheaths glabrate, the ribs bearing appressed and matted, whitish or tawny trichomes distally, the marginal ribs tomentulose at the orifice; leaf blades (20-)30-130(-150) cm long; anthers 1.5-3 mm long; achene body turbinate or short-turbinate, distinctly winged, nearly smooth to faintly rugose; plants of southeastern Brazil.
    - 4a. Leaf blades (9-)10-18(-19) mm wide; inflorescence rachises distinctly flexuose; spikelets 2-3-flowered; fertile scales brown-black to purple-black, ovate to oblong-ovate, acute at apex, the midvein ending as a short mucro at apex, rarely prolonged to 0.5 mm long; achene wing-angles whitened to stramineous; achene body faintly rugose; wing-angles of style base crinkled and blistered, sometimes with scattered crystalline fimbriae or scales distally; bristles essentially absent or represented only by short rudiments at base of achene . . . . . 3. *M. ficticia*
    - 4b. Leaf blades (7-)8-13(-15) mm wide; inflorescence rachises strict or only slightly flexuose; spikelets 1-2-flowered; fertile scales brown, brown-black medially, ovate to ovate-lanceolate, acute to acuminate at apex, the midvein prolonged at apex as a 0.5-1-mm-long awn; achene wing-angles stramineous to light brown, blackened distally along style base; achene body

smooth to obscurely transversely rugulose; wing-angles of style base with crystalline fimbriae or scales; bristles 1–5(–6), at least 1–2 well-developed persistent bristles present at base of achene, rarely all rudimentary . . . 4. *M. austrobrasiliensis*

**1. *Machaerina ensifolia*** (Böckeler) T. Koyama, Bot. Mag. (Tokyo) 69 (812): 63. 1956. *Elynanthus ensifolius* Böckeler, Linnaea 38: 264. 1874. *Cladium ensifolium* (Böckeler) Benth & Hooker f. ex B. D. Jackson, Index Kewensis: 551. 1895. *Baumea ensifolia* (Böckeler) Palla, Denkschr. Akad. Wien Math.-Nat. 79: 104. 1908. TYPE: Brazil. Province de Rio de Janeiro: Itatiaia, 5 June 1871, *Glaziou 5443* (holotype, B fragment; isotypes, C, K, P). Figure 3A.

Caespitose perennial. Culms (40–)60–180 cm tall, (2–)2.5–5.5 mm wide proximally, very finely ribbed, indistinctly septate-nodulose. Sheaths very finely ribbed, glabrate, indistinctly septate-nodulose, the ribs sometimes bearing appressed, whitish or tawny trichomes and the margins tomentulose near apex, light brown to brown distally, dark brown to purple-black or black proximally, lustrous, with a narrow brown scarious margin; blades narrowly lenticular to flattened, slightly to distinctly falcate, (13–)20–90 cm long, (2.2–)3–11(–12) mm wide, indistinctly septate-nodulose, at least near base. Inflorescence 5–13(–15) cm long (including all partial panicles), 2–3.5 cm wide, of 2–3 contiguous or subcontiguous, contracted panicles from the upper sheathing bracts; panicle branches short, the rachises slightly flexuose, varying from trigonous, rectangular, crescentform or flattened in cross section, ciliate-scabrous on margins. Spikelets solitary or in clusters of 2–4, (7–)8–11 mm long, 2.5–4 mm wide, 4–7-flowered, with 1–3 empty scales proximally; fertile scales ovate to narrowly ovate, short-acuminate at apex, (5.5–)6–10 mm long, (2.5–)2.8–3.8(–4.2) mm wide, dark brown to purple-black or black with reddish brown scarious margins at base, brown medially near apex, lustrous, glabrous, margins short-ciliate, lateral veins indistinct, the midvein prominent distally, antrorsely scabrous to smooth, extending as a short mucro at apex. Anthers 3–5 mm long. Achene (Fig. 3A) 6–9 mm long (including stipitate base and style base), 1.5–2 mm wide (including wing); achene body ellipsoid to narrowly ellipsoid or ellipsoid-obovoid, transversely wrinkled along margins at base of wings, uniformly dark brown, lustrous, 3.5–4.5(–5) mm long (measurements from base of 3-winged stipe to top of achene body, excluding style base), 1.1–1.5 mm

wide, distinctly winged, the base stipitate, light brown, triquetrous, wing-angled; style base triquetrous, wing-angled, the angles brown, remotely scabrous distally to essentially smooth, often blackened; bristles absent or rarely a few very short rudimentary ones at base.

*Distribution.* Southeastern Brazil from the States of southern Minas Gerais and southwestern Rio de Janeiro (Serra da Mantiqueira: Mt. Itatiaia) south to eastern São Paulo (Serra da Mantiqueira and Serra da Bocaina), eastern Paraná (Serra do Mar and Serra Putunã), and northeastern Santa Catarina (Serra do Mar).

*Habitat.* *Machaerina ensifolia* is an element of the Brazilian campo and planalto and occurs in damp soils in swamps, wet meadows, and along streams. On Mt. Itatiaia, in the Parque Nacional do Itatiaia, State of Rio de Janeiro, *M. ensifolia* is an element of the planalto vegetation from 2000 to 2400 m elevation. It occurs in moist, dark soils (terra preta) in campestre or along the borders of meadows (várzeas) where it is frequently associated with the grass *Cortaderia modesta* (Doellinger) Hackel (Brade, 1956).

*Additional specimens examined.* BRAZIL. **Minas Gerais:** 10 Jan. 1876, *Glaziou s.n.* (F). **Paraná:** Mun. Palmeira, Rio dos Papagaios, 15 Dec. 1987, *Cordeiro & Hatschbach 507* (C, MBM, MO); Mun. São José dos Pinhais, Rio Pequeno, 27 Nov. 1969, *Hatschbach & Ravenna 23049* (C, MBM, NY, US), 20 Oct. 1994, *Ribas & Cordeiro 681* (BHCB, MBM). **Rio de Janeiro:** *Glaziou 7986* (C, K); Campos de Itatiaia, 23 Jan. 1873, *Glaziou 6759* (B fragment, C, K); nos campos da serra do Itatiaia, 2000 m, Mar. 1894, *Ule 232* (R); vicinity of Itatiaia, 26–30 July 1915, *Rose & Russell 20488* (NY, US); Serra do Itatiaia, in campo, ca. 2200 m, July 1901, *Hemmendorf 581* (R); Serra do Itatiaia, in campo, ca. 2600 m, 29 June 1902, *Dusen 647* (US); Serra do Itatiaia, in campo, ca. 2500 m, Nov. 1903, *Moreira 4* (R); Planalto do Itatiaia, 2000 m, May 1926, *Sampaio 4800* (R); vicinity of Macieiras, Mt. Itatiaia, Estação Biológica, ca. 2000 m, 22°26'S, 44°40'W, 10 Dec. 1928, *Smith 1452* (F); Itatiaia, planalto, 2100 m, 26 Feb. 1936, *Brade 15128* (B); Itatiaia, planalto, 2100 m, Jan. 1938, *Burret & Brade 16015* (B); Itatiaia, planalto a 2200–2400 m, 6 Mar. 1962, *Pereira 7070* (F); Parque Nacional do Itatiaia, 1 July 1975, *Camerik 24* (K). **Santa Catarina:** Mun. Campo Alegre, bog, lower fazenda of Ernesto Scheide, Campo Alegre, ca. 900 m, 11 Dec. 1956, *Smith & Klein 8570* (HBR, NY, R, US); Mun. Campo Alegre, slopes of Morro Iquererim, 1500 m, 9–10 Dec. 1956, *Smith & Klein 8548* (HBR, R, US). **São Paulo:** Barreiro Co., Serra da Bocaina, 24 Nov. 1950, *Segadas-Vianna 3057* (R); Serra da Bocaina, estr. S. J. do Barreiro p/Silveiras, km 22, 1780 m, 2 Jan. 1981, *Shepherd & Shepherd 12873* (UEC); Campos do Jordão, Parque Estadual, camino para São José dos Alpes, ca. 2000 m, 20 Nov. 1985, *Pirani et al. 1382* (NY, SPF).

**2. *Machaerina ayangannensis*** M. T. Strong, sp. nov. TYPE: Guyana. Cuyuni-Mazaruni Region: Pakaraima Mountains, 2 km transect along summit ridge of Mt. Ayanganna, 05°23'N, 59°59'W, 1800–2000 m, 3 Nov. 1992, Henkel 138 (holotype, BRG; isotypes, NY, US sheet #3314219). Figure 2.

Differt a *Machaerina restioide* (Swartz) Vahl, antheris 2–2.5 mm longis; acheniis (3.8–)4–4.7(–5) mm longis, 1–1.3 mm latis; corpore achenio subtiliter transverse ruguloso; stylo fundo indistincte triquetro, minute antrorse spinuloso apice, laevi subter, nitido, brunneo, purpureo-nigro distale, torto et rugoso cum transversis vel longitudinalibus plicis et plicatis extenso deorsum in angulis e corpore achenio.

Caespitose perennial (Fig. 2A). Culms 50–150 cm tall, 6–9 mm wide proximally, channeled on one edge distally, septate-nodulose proximally, finely ribbed. Sheaths essentially glabrous, papillose or papillose-hispid between the ribs distally, septate-nodulose, greenish, brownish, or reddish tinged, with a narrow, brown, scarious margin proximally; blades flattened, slightly falcate, 30–75 cm long, 13–25 mm wide, septate-nodulose. Inflorescence 25–50 cm long (including all partial panicles), 4–10 cm wide, of 2–3 remote to subcontiguous open panicles from the upper sheathing bracts; panicle bracts leaf-like but reduced, often with uncinat apex (Fig. 2B); rachises (Fig. 2C) flexuose, crescentform or subflattened in cross section, ciliate-scabrous on margins. Spikelets (Fig. 2D) solitary or in clusters of 2(–3), 5–6 mm long, 2–3 mm wide, 5–7-flowered, only the prophyll at the base of the spikelet empty; scales ovate to oblong-ovate, acute or sometimes emarginate at apex, 3–5.2 mm long, 1.8–3 mm wide, brown-black to dark purple-black or black, with dark reddish brown scarious margins proximally, dull to sublustrous, minutely antrorsely scabrous-hispid on sides distally, margins ciliate-scabrous, lateral veins indistinct, the midvein prominent, antrorsely scabrous (at least distally), sometimes extending as a very short mucro at apex. Anthers 2–2.5 mm long, the connective prolonged as a reddish, triangular-subulate appendage at apex. Achene (Fig. 2E) (3.8–)4–4.7(–5) mm long (including stipitate base and style base), 1–1.3 mm wide (including wing); achene body obovoid to ellipsoid-obovoid, with convex sides, finely transversely rugulose, with an indistinct constriction just above the stipitate base, 1.8–2 mm long (measurements from base of 3-winged stipe to top of achene body, excluding style base), 1–1.3 mm wide, narrowly winged, brown, the base stipitate, triquetrous, brown, cellular-reticulate; style base indistinctly triquetrous, triangular-lanceolate, minutely an-

trorsely spinulose toward apex, smooth below, shiny, glossy, brown, purple-black distally, lower  $\frac{2}{3}$  confluent with achene body, twisted and wrinkled with transverse or longitudinal folds and pleats that extend down to middle and along angles of achene body; bristles 6, variable in length, shorter than to 1 or 2 exceeding achene body, rarely rudimentary.

*Distribution.* Known only from northern South America, summit of Mt. Ayanganna, Pakaraima Mountains, Guyana.

*Habitat.* Henkel (1995) characterized the habitat on the summit of Mt. Ayanganna as “. . . dense, boggy ‘savanna’ . . . on wet organic soils.” “Small drainages were thickly shrub filled with *Clusia*, *Bonnetia*, and other taxa; the large tank bromeliad with attendant *Utricularia humboldtii* occurred here. Occasional *Bonnetia* groves dotted the slopes among the *Brocchinia* bogs.” Further information from Henkel’s collection notebook describes the habitat as a low sclerophyllous community [with] depression shrub thickets of *Bonnetia* and *Clusia* in organic soils on sandstone. Associated vascular plant species collected by Henkel (series 101–140) and Hoffman (series 3167–3225) include the spermatophytes *Aulonemia* sp., *Baccharis brachylaenoides* DC., *Bonnetia tepuiensis* Kobuski & Steyermark, *Brocchinia* sp., *Byrsonima* sp., *Chusquea linearis* N. E. Brown, *Clidemia tepuiensis* Wurdack, *Cortaderia roraimensis* (N. E. Brown) Pilger, *Clusia* sp., *Drosera* sp., *Epidendrum dendrobioides* Thunberg, Eriocaulaceae, *Everardia disticha* T. Koyama & Maguire, *Ilex retusa* Klotzsch ex Reissek, *Isidrogavia schomburgkiana* (Oliver) Cruden, *Matalea bolivarensis* Morillo, *Melanea sarmentosa* Aublet, *Meriania crassiramis* (Naudin) Wurdack, *Miconia acutifolia* Ule, *M. tinifolia* var. *roraimensis* Wurdack, *Mikania boomii* Pruski, *Octomeria* sp., *Palicourea obtusata* K. Krause, *Psychotria aubletiana* Steyermark, *Phthirusa* sp., *Rhynchospora roraimae* Kükenthal, *Satyria carnosiflora* Lanjouw, *Stegolepis guianensis* Klotzsch, *Stenopadus megacephalus* Pruski, *Symphonia globulifera* L. f., *Tapinostemon* sp., *Tococa erythrophylla* (Ule) Wurdack, *Utricularia humboldtii* R. H. Schomburgk, and *Xyris* sp. Associated pteridophytes include *Blechnum proliferum* Rosenstock, *B. stipitellatum* (Sodiolo) C. Christ, *Cochlidium attenuatum* A. C. Smith, *C. connellii* (C. H. Wright) A. C. Smith, *Cyathea macrosora* var. *macrosora* (Baker) Domin, *Eriosorus flexuosus* var. *flexuosus* (HBK) Copeland, *E. hispidulus* var. *hispidulus* (Kunze) Vareschi, *Gleichenia bifida* (Willdenow) Sprengel, *G. pennigera* (Martius) T. Moore, *Lindsaea stricta* var. *jamesoniiformis* K. U. Kramer, *L. tetraptera* K. U. Kramer,



Figure 2. *Machaerina ayangannensis* M. T. Strong. —A. Habit. —B. Detail of distal portion of upper inflorescence panicle bract showing uncinately apiculate apex. —C. Detail of inflorescence branch showing spikelets. —D. Spikelet. —E. Achene.

*Lycopodiella cernua* (L.) Pichi Sermolli, *Lycopodium duidae* A. C. Smith, *Pterozonium elaphoglossoides* (Baker) Lellinger, and *Selaginella amazonica* Spring.

*Machaerina ayangannensis* is most closely related to the West Indian species *M. restioides* (Swartz) Vahl. Shared characteristics include the distinctly flexuose inflorescence rachises, minutely antrorsely

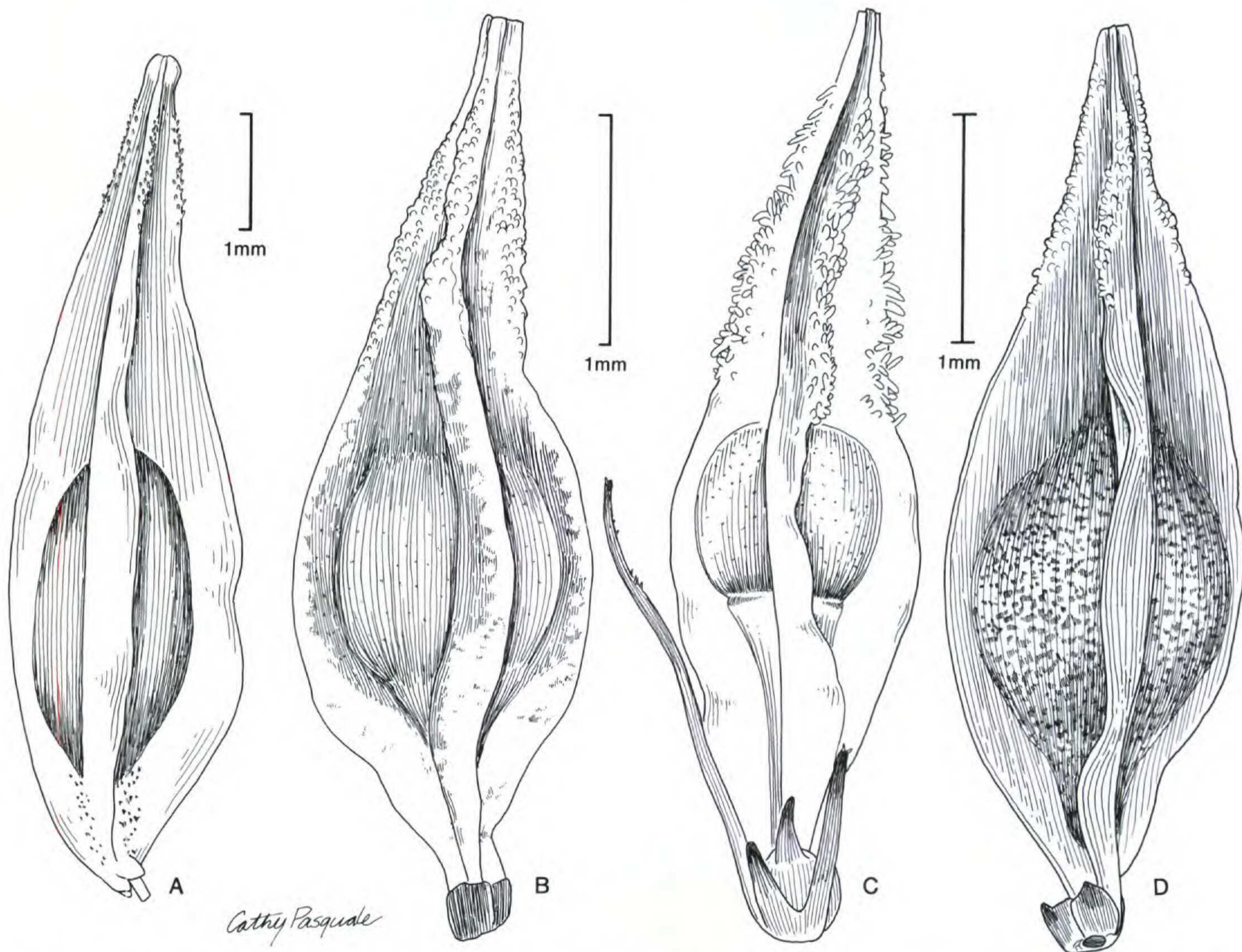


Figure 3. Achenes of four species of *Machaerina* from South America. —A. *M. ensifolia*. —B. *M. ficticia*. —C. *M. austrobrasiliensis*. —D. *M. scirpoidea*. (A from Ule 232; B from Castellanos 23007; C from Hatschbach 22776; D from Kuschel 82.)

scabrous-hispid sides of the spikelet scales, and 6, variable in length, persistent bristles at the base of the achene. However, *M. ayangannensis* differs in having anthers 2–2.5 mm long; achenes (3.8–)4–4.7(–5) mm long, 1–1.3 mm wide; finely transversely rugulose achene body; and indistinctly triquetrous, glossy brown to purple-black, minutely antrorsely spinulose distally, twisted and wrinkled style base with longitudinal folds and pleats that extend down to middle and along angles of achene body vs. anthers 1–1.8 mm long; achenes 1.8–2.5 mm long, 0.6–0.9 mm wide; indistinctly rugulose to nearly smooth medially or sometimes venose achene body; and triquetrous, scabrous-hispid style base in *M. restioides*.

**3. *Machaerina ficticia*** (Hemsley) T. Koyama, *Bot. Mag. (Tokyo)* 69 (812): 63. 1956. *Cladium ficticium* Hemsley, *Rep. Challenger Bot. part 3*: 59. 1884. *Mariscus ficticius* (Hemsley) Fernald, *Rhodora* 25: 53. 1923. *Machaerina scirpoidea* subsp. *ficticia* (Hemsley) T. Koyama, *Mem. New York Bot. Gard.* 23: 89. 1972.

TYPE: Brazil. Province de Rio de Janeiro: haut des Orgães, 23 Oct. 1872, *Glaziou 6421* (lectotype, selected here, K; isolectotypes, B fragment, NY, P). Figure 3B.

*Vincentia macrophylla* Böckeler, *Allg. Bot. Z. Syst.* 2: 112. 1896. *Cladium ficticium* var. *macrophyllum* (Böckeler) Kükenthal, *Repert. Spec. Nov. Regni. Veg.* 51: 143. 1942. *Machaerina macrophylla* (Böckeler) T. Koyama, *Bot. Mag. (Tokyo)* 69 (812): 64. 1956. TYPE: Brazil. Province de Rio de Janeiro: haut des Orgães, 6 Mar. 1889, *Glaziou 17861* (holotype, B fragment; isotypes, C, K, P).

Caespitose perennial. Culms (30–)50–150 cm tall, 4–8(–9) mm wide proximally, finely ribbed. Sheaths septate-nodulose, glabrous or the ribs bearing appressed and matted, whitish or tawny trichomes distally and the margins tomentulose near summit, green distally, brown to dark brown proximally, with a brown to dark brown, narrow, scarious band on margin proximally; blades slightly falcate, (20–)30–130(–150) cm long, (9–)10–18(–19) mm wide, indistinctly septate-nodulose. Inflorescence (15–)20–60(–70) cm long (including all par-



tial panicles), 4–8(–9) cm wide, of 2–3 remote to subcontiguous open panicles from the upper sheathing bracts; rachises flexuose, ciliate-scabrous to villous on margins. Spikelets solitary or in clusters of 2–3, 5–7 mm long, 1.8–2.5 mm wide, 2–3-flowered, the scales distichous, 5–7, spreading at maturity, the lowermost 3–4 empty; fertile scales ovate to oblong-ovate, acute at apex, (2.5–)3–5 (–5.5) mm long, 1.8–3 mm wide, brown-black to purple-black with reddish brown scarious margins proximally, lustrous, essentially glabrous, sometimes with a few patches of appressed, matted, whitish trichomes on sides distally, margins ciliate or entire, lateral veins indistinct, the midvein prominent, extending as a short mucro at apex, rarely prolonged as a short (to 0.5 mm long) awn. Anthers 1.5–2.5(–3) mm long. Achene (Fig. 3B) (3.0–)4–5 mm long (including stipitate base and style base), 1–1.3 mm wide (including wing), wing-angled, the wing-angles whitened to stramineous; achene body short-turbinate with a distinct constriction just above the stipitate base, 2–2.2 mm long (measurements from base of 3-winged stipe to top of achene body, excluding style base), (0.7–)0.8–1.2(–1.3) mm wide, brown to reddish brown or grayish black, faintly rugose, narrowly winged, the base stipitate, 3-winged; style base triquetrous, triangular-lanceolate, wing-angled, brown, the wing-angles thickened, whitened proximally, rarely blackened, crinkled and blistered, often with scattered, minute, crystalline fimbriae or scales distally; bristles essentially absent or sometimes a few very short rudimentary ones at base.

*Distribution.* Southeastern Brazil from the State of southeastern Minas Gerais (Serra do Caparaó) south to the State of Rio de Janeiro (Serra dos Órgãos).

*Habitat.* Moist soils in meadows and openings; 1400–2400 m elevation.

Luetzelburg (1923) listed *Cladium ensifolium* H. Pfeiffer as occurring in the Serra dos Órgãos, Isabelloca, 2000 m, and Serra da Estrella, Frade, 1500 m (both localities of which are just northwest of the city of Rio de Janeiro, Brazil), and cited *Agylla ensifolia* F. Philippi as a synonym. However, *A. ensifolia* is a synonym of *Machaerina scirpoidea* (Steudel) T. Koyama, a plant endemic to Isla Más a Tierra, Juan Fernández Islands, Chile. Pfeiffer and Palla were given credit by Luetzelburg for making the determinations of Cyperaceae for his list of collections from Brazil. The determination on the specimen label of Luetzelburg 6852 (M) is *Cladium ensifolium* H. Pfeiffer, an apparent transfer of *Agylla ensifolia* to *Cladium* proposed by Pfeiffer.

However, the plant on the sheet is a specimen of *Machaerina ficticia* (Hemsley) T. Koyama, a species that is well documented from Serra dos Órgãos, State of Rio de Janeiro, Brazil. It is not clear why Pfeiffer made a transfer of *Agylla ensifolia* F. Philippi to *Cladium* in 1923 when the name *Cladium scirpoideum* (based on *Terobera scirpoidea*), a plant that had been previously documented both by Böckeler (1874) and Hemsley (1884) as being conspecific with *Agylla ensifolia*, was available.

This plant has frequently been placed infraspecifically with *Machaerina scirpoidea*. When Böckeler (1874) made a transfer of Steudel's *Terobera scirpoidea* to *Vincentia*, he included Brazil within the range of *Vincentia scirpoidea* (Steudel) Böckeler, citing an unspecified collection of Glaziou, most likely either the type of, or one of the collections cited herein for, *M. ficticia*. Koyama (1972) accepted this, placing *M. ficticia* at the rank of subspecies (*Machaerina scirpoidea* subsp. *ficticia* (Hemsley) T. Koyama). *Machaerina ficticia* does show some relationship with *M. scirpoidea*, particularly the leaf sheaths and blades. However, it differs from *M. scirpoidea* in having distinctly flexuose inflorescence rachises; spikelet scales short-mucronate at apex, the mucro rarely prolonged to 0.5 mm long; anthers 1.5–2.5(–3) mm long; achene wing-angles whitened to stramineous; and achene body (including stipitate base) turbinate or short-turbinate, the surface faintly rugose vs. strict or slightly flexuose inflorescence rachises; spikelet scales with 0.5–1-mm-long awns; anthers 3–4 mm long; achene wing-angles brown; and ellipsoid-globose achene body of *M. scirpoidea*.

A specimen from Rio Grande do Sul, Cambará, p. S. Francisco de Paula, collected 18 Feb. 1955 by Rambo 56824 (B) (not mapped), is referable to *Machaerina ficticia*. The achenes and flexuose inflorescence rachises of this specimen are similar to *M. ficticia*. However, this collection represents a 1200–1400-km disjunction to the south from the center of distribution of this species in the States of southeastern Minas Gerais and Rio de Janeiro. Rambo noted (on the specimen label) that this collection was a “species in RGS (Rio Grande do Sul) semel solum inventa.” Additional collections of this plant are needed before a determination can be made of its relationships with other species of *Machaerina* in southeastern Brazil and whether it might represent a new taxon.

*Additional specimens examined.* BRAZIL. **Minas Gerais:** Serra do Caparaó, Cachoeira da Fumaça, 1900 m, 1 Oct. 1941, Brade 17053 (B). **Rio de Janeiro:** haut des Órgãos, 8 Aug. 1869, Glaziou 3617 (C, K, P, US); Theresópolis, Pedra-Assu, Campo das Antas, 2000 m, 30

Sep. 1929, *Brade* 9497 (B, F, R); Sta. Magdalena, Pedra Dubois, 1200 m, May 1934, *Lima* 240 (B); Serra dos Órgãos, Morro Assu, 2400 m, June 1916, *Luetzelburg* 6852 (M, NY); Serra dos Órgãos, Centralstock, (Staat Rio), 2000 m, June 1916, *Luetzelburg* 7230i (M); Serra dos Órgãos, Cachoeira do Riacho Frio, 1400 m, 23 Aug. 1940, *Brade* 16615 (R); Serra dos Órgãos, Campo das Antas, 2100 m, 31 Aug. 1940, *Brade* 16516 (MO); Serra dos Órgãos, Abrg. 4, 19 Oct. 1958, *Emmerich* 136 (R); Theresópolis, Parque Nacional Serra dos Órgãos, Campo das Antas, 9 Dec. 1960, *Castellanos* 23007 (F, NY); Parque Nacional Serra dos Órgãos, Pedra da Balboa, 2000 m, 20 Dec. 1972, *Vidal II-5714* (NY, R); Mun. Petrópolis, entre Araras e Vale das Videiras, Morro do Cuca, Pico do Pindoba, 1600 m, 2 June 1984, *Martinelli et al.* 9885 (NY).

**4. *Machaerina austrobrasiliensis*** M. T. Strong, sp. nov. TYPE: Brazil. Paraná: Mun. Campina Grande do Sul, Serra do Capivari Grande, alt. 1500 m, *Hatschbach* 22776 (holotype, MBM; isotypes, C, F, MO). Figure 3C.

Differt a *Machaerina ficticia* (Hemsley) T. Koyama, laminae foliorum (7–)8–13(–15) mm latis; rhachidibus inflorescentiis strictis vel leviter flexuosis; spiculis 1–2-floribus; squamis fertilibus brunneis, brunneo-nigris in mediis, ovatis ad ovatolanceolatas, acutis ad acuminatas ad apices, nervo medio prolongato ad apicem pro arista 0.5–1 mm longa; alatoangulis acheniis stramineis ad pallida brunnea, denigratis distalibus in stylo base; corpore achenio laevi ad obscure transverse rugulosum; alatoangulis stylis praeditis crystallinis fimbriis vel squamis; setis 1–5(–6), saltem 1–2 bene-evolutis et persistentibus basibus acheniis, raro totis rudimentis.

Caespitose perennial. Culms (25–)40–90(–100) cm tall, 3–5(–5.5) mm wide proximally, finely ribbed. Sheaths glabrous or the ribs bearing appressed and matted, whitish or tawny trichomes distally and the margins tomentulose near summit, green distally, light brown to brown proximally, with a brown to dark brown, narrow, scarious band on margin proximally; blades slightly falcate, (20–)30–80(–100) cm long, (7–)8–13(–15) mm wide, indistinctly septate-nodulose (at least proximally). Inflorescence (15–)20–50 cm long (including all partial panicles), (3.5–)4–8(–10) cm wide, of 2–3 remote to subcontiguous open panicles from the upper sheathing bracts; rachises strict or slightly flexuose, crescentform to flattened in cross section, the margins glabrate, ciliate-scabrous at the nodes. Spikelets solitary or in clusters of 2–3, 4–6 mm long, 1.5–2.5 mm wide, 1–2-flowered, the scales 5–7, distichous, spreading at maturity, the lowermost 2–5 empty; fertile scales ovate to ovate-lanceolate, acute to acuminate at apex, 4–6 mm long, 1.8–2.3 mm wide, essentially glabrous, sometimes with a few patches of appressed, matted, whitish trichomes on sides distally, brown to brown-black medially, with reddish brown scarious margins, lustrous, margins ciliate or rarely entire, lateral veins indistinct,

the midvein prominent, prolonged as a 0.5–1-mm-long awn. Anthers 2–3 mm long. Achene (Fig. 3C) (2.5–)3–4.2 mm long (including stipitate base and style base), 1–1.3 mm wide (including wing), wing-angled, the wings 0.2–0.3 mm broad along achene body; achene body turbinate with a distinct constriction just above the stipitate base, 2–2.5 mm long (measurements from base of 3-winged stipe to top of achene body, excluding style base), 0.6–0.8 mm wide, stramineous to light brown, nearly smooth to obscurely transversely rugulose, the base stipitate, 3-winged; style base triquetrous, triangular-lanceolate, wing-angled, stramineous to light brown, the wing-angles thickened, lustrous, dark brown to brown-black, with minute crystalline fimbriae or scales; bristles 1–5(–6), 1–2 equaling to exceeding the achene, some very short and rudimentary at base, rarely all rudimentary, smooth to antorsely scabrous above middle.

*Distribution.* Southeastern Brazil from the State of eastern Paraná (Serra do Mar) south to southeastern Santa Catarina (Serra do Oratório and Serra Geral) and northeastern Rio Grande do Sul (Serra Geral).

*Habitat.* In damp soils and marshy places of campo rupestre and planalto, on steep slopes of hillsides, margins of creeks, and steep rock outcrops along rivers and ravines, 1000–2000 m elevation.

Barros (1960) referred one of the specimens cited below (*Reitz & Klein* 7165) to *Cladium ficticium* var. *macrophyllum* (Böckeler) Kükenthal. However, the type of *Vincentia macrophylla* Böckeler (*Glaziou* 17861) is conspecific with *Machaerina ficticia*.

*Paratypes.* BRAZIL. **Paraná:** Mun. Campina Grande do Sul, Pico Caratuba, 1950 m, 6 Oct. 1967, *Hatschbach* 19925 (MBM, US); Mun. Campina Grande do Sul, Serra Ibitiraquire, Abrigo 1, 1600 m, 25 Sep. 1969, *Hatschbach* 22207 (MBM, MO); Mun. Campina Grande do Sul, Serra Ibitiraquire, trilha ao Pico Serra do Paraná, Pouso da Sorte, 17 June 1973, *Imaquire* 1000 (MBM); Mun. Campina Grande do Sul, Serra do Capivari Grande, 1200 m, 18 July 1986, *Cordeiro & Zelma* 310 (MBM, US); Mun. Campina Grande do Sul, Serra do Capivari Grande, 1300 m, 24 Aug. 1989, *Nicolack & Cordeiro* 127 (MBM, US); Mun. Guaratuba, Serra de Araçatuba, 1300 m, 22 Nov. 1959, *Hatschbach* 6525 (MBM); Mun. Guaratuba, Serra do Araçatuba, 1300 m, 15 Sep. 1982, *Kummrow* 2026 (MBM). **Rio Grande do Sul:** Mun. Cambara do Sul–Fortaleza, 1050 m, 27 Sep. 1992, *Wasum et al.* 8679 (US). **Santa Catarina:** Mun. Bom Jardim da Serra, Serra do Oratório, São Joaquim, 1500 m, 18 Sep. 1958, *Reitz & Klein* 7165 (HBR, NY, US); Mun. Bom Jardim da Serra, headwaters of Rio Capivari, 17 Dec. 1971, *Smith & Klein* 15861 (R, US); Mun. Bom Jardim da Serra, Desfiladeiro do Funil, Jan. 1986, *Sobral et al.* 4854 (NY); Mun. Bom Jardim da Serra, Serra do Rio do Rastro, 1200 m, 8 Nov. 1986, *Falkenberg & Souza* 3991 (MBM); Mun. Lauro Müller, Serra

do Rio do Rastro, 18 Apr. 1994, *Hatschbach & Barbosa* 60643 (MBM).

**5. *Machaerina scirpoidea*** (Steudel) T. Koyama, *Bot. Mag. (Tokyo)* 69 (812): 65. 1956. *Terobera scirpoidea* Steudel, *Syn. Pl. Glumac.* 2: 164. 1855. *Vincentia scirpoidea* (Steudel) Böckeler, *Linnaea* 38: 250. 1874. *Cladium scirpoideum* (Steudel) Benth & Hooker f. ex Hemsley, *Rep. Challenger Bot. part 3*: 59. 1884. *Mariscus scirpoideus* (Steudel) Kuntze, *Revis. Gen. Pl.* 2: 755. 1891. TYPE: Chile. Juan Fernández Islands: *scirpoidea mihi ignota, ad rupium fissuras in frigidis rusticum editorum*, Apr. 1830, *Bertero 1509* (holotype, P). Figure 3D.

*Agylla ensifolia* F. Philippi, *Anales Univ. Chile* 26 (1): 643. 1865. *Cladium ensifolium* (F. Philippi) H. Pfeiffer, in Luetzelburg, *Estud. Bot. Nordéste* 126. 1923. TYPE: Chile. Juan Fernández: Nov. 1864, *Philippi s.n.* (holotype, SGO).

Caespitose perennial. Culms 50–150 cm tall, 4–6 mm wide proximally, channeled on one edge distally, smooth, finely ribbed, glabrous or sometimes a few crystalline trichomes scattered along the ribs. Sheaths minutely punctate between the ribs abaxially (at least distally), indistinctly septate-nodulose, glabrous, green distally, brown to dark brown proximally, with a brown to dark brown narrow scarious band on margin proximally; blades slightly falcate, 60–250 cm long, (7–)8–18(–19) mm wide, indistinctly septate-nodulose. Inflorescence 20–50 cm long (including all partial panicles), 3–9(–10) cm wide, of 2–3 remote to subcontiguous open panicles from the upper sheathing bracts; rachises strict or only slightly flexuose, crescentform or flattened in cross section, ciliate-scabrous on margins. Spikelets solitary or in clusters of 2–3, 6–7 mm long, 2–2.5 mm wide, 2–3-flowered, the scales 4–5, distichous, spreading at maturity, the lowest 1–2 empty; fertile scales ovate to ovate-lanceolate, acute to short-acuminate at apex, 4.5–6(–6.2) mm long, 1.8–3 mm wide, dark brown to dark brown-black with dark brown to dark reddish brown scarious margins proximally, lustrous, essentially glabrous, sometimes with a few patches of appressed, matted, whitish trichomes on sides distally, margins entire or ciliate, lateral veins indistinct, the midvein prominent distally, prolonged at apex as a 0.5–1-mm-long awn. Anthers 3–4 mm long. Achene (Fig. 3D) 3.5–4.5 mm long (including stipitate base and style base), 1–1.3 mm wide (including wing); achene body ellipsoid-globose with a constriction just above the stipitate base, 1.8–2.3 mm long (measurements from base of 3-winged stipe to top of achene body, excluding style base), 1–1.2 mm

wide, narrowly winged or wing absent, brown, faintly rugulose with dark brown to blackish rugae, the base stipitate, 3-winged; style base triquetrous, triangular-lanceolate, wing-angled, brown, the wing-angles thickened, crinkled and blistered; bristles absent or rarely a few very short rudimentary ones at base.

*Distribution.* Known only from Isla Más a Tierra, Juan Fernández Islands off the west coast of Chile. Luetzelburg (1923) cited *Cladium scirpoideum* Hemsley as occurring in the Serra dos Órgãos, Açú, 2300 m, in his list of species and families collected during his travels in Brazil. Palla and Pfeiffer were cited by Luetzelburg as doing the determinations of Cyperaceae for this list. It is most likely that one of these authorities (probably Pfeiffer) followed Böckeler's (1874) circumscription of this species, which included Glaziou's collections of *Machaerina ficticia* from Serra dos Órgãos.

*Habitat.* Wet or swampy ground along streams, or hanging over rocks in and bordering the summit of waterfalls, 183–630 m elevation. Johow (1896) recorded *M. scirpoidea* as occurring at Pangal (Pangal Falls) and in the border of the estuary that surrounds the Plazuela del Yunque.

*Additional specimens examined.* CHILE. **Juan Fernández Islands:** *Philippi 27* (B fragment); Feb. 1876, *Moseley s.n.* (K); Isla Más a Tierra, Cordon Salsipuedes, 630 m, 8 Dec. 1916, *Skottsberg & Skottsberg 72* (B, K, US); Isla Más a Tierra, in the gap between Yunque and Damajuine, 600 m, 8 Dec. 1916, *Skottsberg & Skottsberg 163* (C, NY); 1923, *Tenz 14* (B); Isla Más a Tierra, en las paredes de la caída de agua en el Pangal, 27 Feb. 1936, *Espinosa s.n.* (SGO); Isla Más a Tierra, Corrales de Molina, 9 Jan. 1955, *Kuschel 82* (C, NY, US); Isla Más a Tierra, Salto de Pangal, in the waterfall, ca. 220 m, 22 Sep. 1955, *Sparre & Planella 144* (K, US); Isla Más a Tierra, S-Hang des Yunque, 560 m, 1 Feb. 1962, *Kubitzki 212* (M); Isla Más a Tierra, Pangal Falls, ca. 183 m, 18 Dec. 1965, *Meyer 9596* (K, MO); Isla Más a Tierra, Quebrada de Villagra, Salto de La Pulga, 445 m, 28 Jan. 1980, *Marticorena et al. 9035* (M).

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Literature Cited

- Barros, M. 1960. Las Ciperaceas del Estado de Santa Catalina. *Sellowia* 12: 181–450.
- Bentham, G. 1878. Cyperaceae. Pp. 246–449 in: *Flora Australiensis* 7. L. Reeve, London.
- . 1883. Cyperaceae. Pp. 1037–1073 in: G. Bentham & J. D. Hooker, *Genera Plantarum* 3. L. Reeve, London.
- Blake, S. T. 1969. Studies in Cyperaceae. Contributions from the Queensland Herbarium, No. 8: 1–48.
- Böckeler, O. 1874. Die Cyperaceen des königlichen Herbariums zu Berlin. *Linnaea* 38: 223–544.
- Brade, A. C. 1956. A flora do Parque Nacional do Itatiaia. Boletim No. 5, Serviço Florestal, Ministério da Agricultura, Parque Nacional do Itatiaia.
- Brown, R. 1810. Cyperaceae. Pp. 212–243 in: *Prodromus floræ Novæ Hollandiæ et insulæ Van-Diemen* 1. J. Johnson, London.
- Browne, P. 1756. *The Civil and Natural History of Jamaica*. T. Osborne and J. Shipton, London.
- Bruhl, J. J. 1995. Sedge genera of the world: Relationships and a new classification of the Cyperaceae. *Austral. Syst. Bot.* 8: 125–305.
- Clarke, C. B. 1894. Cyperaceae. Pp. 673–748 in: J. D. Hooker, *The Flora of British India* 6. L. Reeve, London.
- . 1908. New genera and species of Cyperaceae. *Bull. Misc. Inf. Kew, Addit. Ser.* 8.
- Endlicher, S. 1836. *Genera plantarum*. Friedrich Beck, Vindobonae.
- Goetghebeur, P. 1986. *Genera Cyperacearum*. Een bijdrage tot de kennis van de morfologie, systematiek en fylogeneses van de Cyperaceae-genera. Unpublished Dr. Sci. Thesis, State University, Gent.
- Gaudichaud-Beaupré, C. 1829. *Voyage autour du monde, entrepris par ordre du roi, . . . exécuté sur les corvettes de S.M. l'Uranie et la Physicienne, pendant les années 1817, 1818, 1819, et 1820; publié . . . par M. Louis de Freycinet*. Botanique. Part 10. Pillet-ainé, Paris, pp. 401–432.
- Haines, R. W. & K. A. Lye. 1983. *The Sedges and Rushes of East Africa*. East African Natural History Society, Nairobi.
- Hemsley, W. B. 1884. Report on the scientific results of the voyage of H.M.S. Challenger during the years 1873–1876. Botany, vol. 1, part 3. London (Her Majesty's Stationery Office), Edinburgh, Dublin.
- Henkel, T. 1995. Expedition Reports-Guyana: Report on a Botanical Expedition to Mt. Ayanganna, Guyana, October–November, 1992. Biological Diversity of the Guianas Program, Smithsonian Institution, Washington, D.C.
- Johow, F. 1896. Estudios sobre la flora de las Islas de Juan Fernandez. Imprenta Cervantes, Santiago de Chile.
- Kern, J. H. 1959. *Florae Malesianae precursores XXII. Cladium and Machaerina* (Cyperaceae). *Acta Bot. Neerl.* 8: 263–268.
- . 1974. Cyperaceae. Pp. 435–753 in: C. G. G. J. Van Steenis, *Flora Malesiana*, ser. 1, 7(3). Noordhoff International Publ., Leiden.
- Koyama, T. 1956. Taxonomic study of Cyperaceae V. *Bot. Mag. Tokyo* 69(812): 59–67.
- . 1972. Cyperaceae–Rhynchosporae and Cladidae. In: B. M. Maguire, *The Botany of the Guayana Highland—Part 9*. *Mem. New York Bot. Gard.* 23: 23–89.
- Kükenthal, G. 1942. Vorarbeiten zu einer Monographie der Rhynchosporideae. XII. *Repert. Spec. Nov. Regni Veg.* 51: 1–17; 139–193.
- Kunth, C. S. 1837. *Enumeratio plantarum*. 2. *Cyperographia Synoptica sive enumeratio Cyperacearum*. J. G. Cotta, Stuttgart.
- Luetzelberg, P. von. 1923. Estudo botânico do nordeste. Publicação no. 57, Série I, A., Volume terceiro, Inspectoria federal de obras contra as seccas, Rio de Janeiro.
- Lye, K. A. 1983. Studies in African Cyperaceae 27. Miscellaneous new taxa and combinations. *Nordic J. Bot.* 3: 241–244.
- Nees von Esenbeck, C. G. D. 1834. Uebersicht der Cyperaceengattungen. *Linnaea* 9: 273–306.
- Steudel, E. G. 1855. *Synopsis plantarum glumacearum*. Part 2, Cyperaceae. J. B. Metzler, Stuttgart.
- Takhtajan, A. 1986. *Floristic Regions of the World*. Univ. California Press, Berkeley.
- Vahl, M. 1805. *Enumeratio Plantarum*. 2: 218–320. Havnæ.